## DETAILED ACTION

### *Claim Rejections - 35 USC § 101*

1. 35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

Claims 1-21 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter. Inventions claimed in claims 1 to 21 produce no tangible result. Updating of error values produces no tangible results.

### *Double Patenting*

2. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

3. Claims 1, 8, and 15 rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claim 2 of U.S. Patent No. 6,692,088.

Although the conflicting claims are not identical, they are not patentably distinct from each other because they all relate to updating of error values used in determining what voltage is required to take a valve from a de-energized state to a just-closed position.

### *Claim Rejections - 35 USC § 103*

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. Claims 1 – 13, 15 – 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Stumpe, et al. (5,669,678), henceforth referred to as "Stumpe/678", in view of Schubert (6,030,055), henceforth referred to as "Schubert/055", further in view of Schappler et al. (5,560,688), henceforth referred to as "Schappler/688".

As to claim 1, Stumpe/678 shows a non-iterative boundary value correction method (col 5, line 46 – 48) comprising the steps of deriving (col 4, line 23 – 24) a non-iterative (col 5, line 56 – 59) equation (col 6, line 56) that gives a calculated correction to a boundary value component (col 5, line 46 – 48) in a pressure control system (col 2, line 50 – 67), and applying a correction in the amount of the calculated error to the boundary value component of the pressure control system (col 5, line 39 – 43). Stumpe/678 further updates a value

representing the voltage necessary to take a valve of the pressure control system from a de-energized state to a just closed position (col 6, line 37 - 57; col 7, line 8 - 10).

However, Stumpe/678 does not show where the boundary value error and updating of voltage value are based on an error between commanded pressure and observed pressure. Stumpe/678 further does not show where the method observes an error between the commanded pressure and the observed pressure that is attributable to boundary value error, and then calculates a value of the error between the commanded pressure and the observed pressure.

Schubert/055 shows the commonly well-known method in the art where the boundary value error is based on an error between commanded pressure and observed pressure (col 4, line 12 – 16). Schubert/055 further shows the also commonly well-known method in the art of observing an error between the commanded pressure and the observed pressure (col 4, line 5 – 9) that is attributable to boundary value error (col 1, line 25 – 41), and then calculating a value of the error between the commanded pressure and the observed pressure (col 4, line 12 – 14).

It would have been obvious to one of ordinary skill in the art to modify the invention of Stumpe/678 by using the commonly well-known method in the art where the boundary value error and updating of voltage value are based on an error between commanded pressure and observed pressure. Further, modifying the invention by including the also commonly well-known method in the art of

observing an error between the commanded pressure and the observed pressure that is attributable to boundary value error and then calculating a value of the error between the commanded pressure and the observed pressure as demonstrated by Schubert/055.

However, Stumpe/678 and Schubert/055 still do not show where the just-closed position has substantially zero seat force.

Schappler/688 teaches a commonly well-known brake pressure calibration method where the voltage necessary to take a valve of the pressure control system from a de-energized state to a just-closed position with substantially zero seat force is found (col 3, line 9-10). Where the inlet valve in shown passage is a solenoid valve that is analogous to applicant's valves, and the phrase "begins to open" obviously shows that the just closed value is the value before the actuation value Yv taught by Schappler/688.

It would have been obvious to one of ordinary skill in the art to provide Stumpe/678 with Schappler/688's teaching since it is commonly well-known and would have been a matter of design choice as to which parameter of the braking system to calibrate, as indicated by Stumpe/678 (col 6, line 37 - 57; col 7, line 8 - 10).

As to claim 2, Stumpe/678 and Schubert/055 disclose all elements per claimed invention as explained in paragraph regarding claim 1 above.

However, Stumpe/678 does not show that the boundary value component is calculated based on a single determination of the error between the commanded pressure and the observed pressure.

Schubert/055 shows a boundary value correction method that uses the commonly well-known method in the art of using a boundary value component that is calculated based on a single determination of the error between the commanded pressure and the observed pressure (col 5, line 28 – 49).

It would have been obvious to one of ordinary skill in the art to modify the invention of Stumpe/678 by using the commonly well-known method in the art of using a boundary value component that is calculated based on a single determination of the error between the commanded pressure and the observed pressure as demonstrated by Schubert/055.

As to claim 3, Stumpe/678 further shows the boundary value correction method implemented each time the pressure control system using the boundary value correction method is operated (col 7, line 52 – 55).

As to claim 4, Stumpe/678 further shows the error between the commanded pressure and the observed pressure determined for an entire operating range of pressures (col 6, line 32 – 35) of the pressure control system.

As to claim 5, Stumpe/678 further shows the boundary value errors for the

range of pressures determined by at least one of a pressure upward sweep (col 4, line 30 – 57) and a pressure downward sweep through the range of pressures (col 4, line 58).

As to claim 6, Stumpe/678 further shows the boundary value errors for the range of pressures determined by both of a pressure upward sweep (col 4, line 30 – 57) and a pressure downward sweep through the range of pressures (col 4, line 58).

As to claim 7, Stumpe/678 further shows the pressure downward sweep has different rates of pressure (col 4, line 30 – 31) decrease at different regions in the range of pressures (col 4, line 31 – 38).

As to claim 8, Stumpe/678 shows a boundary value correction method comprising the steps of determining boundary values in a first range of pressure differentials (col 5, line 13 – 24) for a valve and estimating a boundary value for a second range of pressure differentials (col 5, line 24 – 28) across the valve. Stumpe/678 further updates a value representing the voltage necessary to take a valve of the pressure control system from a de-energized state to a just closed position (col 6, line 37 - 57; col 7, line 8 - 10).

Stumpe/678 does not show the boundary value correction method applying a model to the determined boundary values.

Schubert/055 shows a boundary value correction method applying a model to the determined boundary values (col 4, line 30 – 34). Schubert/055 teaches that applying a model to the determined boundary values helps describe the relationship between the boundary value and the actual pressure in a valve (col 4, line 31 – 33).

It would have been obvious to one of ordinary skill in the art to modify the invention of Stumpe/678 by applying a model to the determined boundary values in order to help describe the relationship between the boundary value and the actual pressure in a valve.

However, Stumpe/678 and Schubert/055 still do not show where the just-closed position has substantially zero seat force.

Schappler/688 teaches a commonly well-known brake pressure calibration method where the voltage necessary to take a valve of the pressure control system from a de-energized state to a just-closed position with substantially zero seat force is found (col 3, line 9-10). Where the inlet valve in shown passage is a solenoid valve that is analogous to applicant's valves, and the phrase "begins to open" obviously shows that the just closed value is the value before the actuation value Yv taught by Schappler/688.

It would have been obvious to one of ordinary skill in the art to provide Stumpe/678 with Schappler/688's teaching since it is commonly well-known and would have been a matter of design choice as to which parameter of the braking

system to calibrate, as indicated by Stumpe/678 (col 6, line 37 - 57; col 7, line 8 - 10).

As to claim 9, Stumpe/678 and Schubert/055 show all elements per claimed invnetion as explained in paragraph regarding claim 8 above.

However it is silent as to the specifics of the first range of pressure differentials are from about 0 bar to about 50 bar.

Nevertheless, it would have been obvious to one having ordinary skill in the art at the time of the invention was made to have provide to Stumpe/678 and Schubert/055 with such first range of pressure differentials from about 0 bar to about 50 bar, since it has been held that where general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. In re Aller, 105 USPQ 233.

As to claim 10, Stumpe/678 and Schubert/055 show all elements per claimed invnetion as explained in paragraph regarding claim 9 above.

However it is silent as to the specifics of the second range of pressure differentials are from about 50 bar to about 120 bar.

Nevertheless, it would have been obvious to one having ordinary skill in the art at the time of the invention was made to have provide to Stumpe/678 and Schubert/055 with such second range of pressure differentials from about 50 bar to about 120 bar, since it has been held that where general conditions of a claim

are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. In re Aller, 105 USPQ 233.

As to claim 11, Stumpe/678 and Schubert/055 show all elements per claimed invnetion as explained in paragraph regarding claim 8 above.

However it is silent as to the specifics of the first range of pressure differentials are from about 120 bar to about 180 bar.

Nevertheless, it would have been obvious to one having ordinary skill in the art at the time of the invention was made to have provide to Stumpe/678 and Schubert/055 with such first range of pressure differentials from about 120 bar to about 180 bar, since it has been held that where general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. In re Aller, 105 USPQ 233.

As to claim 12, Stumpe/678 and Schubert/055 show all elements per claimed invnetion as explained in paragraph regarding claim 11 above.

However it is silent as to the specifics of the first range of pressure differentials are from about 50 bar to about 120 bar.

Nevertheless, it would have been obvious to one having ordinary skill in the art at the time of the invention was made to have provide to Stumpe/678 and Schubert/055 with such first range of pressure differentials from about 50 bar to about 120 bar, since it has been held that where general conditions of a claim

are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. In re Aller, 105 USPQ 233.

As to claim 13, Stumpe/678 and Schubert/055 disclose all elements per claimed invention as explained in paragraph regarding claim 12 above.

However, Stumpe/678 does not show that the model is an estimation model using at least one valve constant and a pressure value at which the boundary value is estimated.

Schubert/055 shows a boundary value correction method where the model is an estimation model using at least one valve constant (col 4, line 32 – 33) and a pressure value at which the boundary value is estimated (col 4, line 34). Schubert/055 teaches that applying a model that is an estimation model using at least one valve constant and a pressure value at which the boundary value is estimated helps describe the relationship between the boundary value and the actual pressure in a valve (col 4, line 31 – 33).

It would have been obvious to one of ordinary skill in the art to modify the invention of Stumpe/678 and Schubert/055 by adding a model that is an estimation model using at least one valve constant and a pressure value at which the boundary value is estimated in order to help describe the relationship between the boundary value and the actual pressure in a valve.

As to claim 15, Stumpe/678 shows an iterative boundary value correction method (col 1, line 66 – col 2, line 3) comprising the steps of deriving (col 4, line

23 – 24) an iterative (col 1, line 67) equation (col 6, line 56) that gives a calculated correction to a boundary value component (col 5, line 46 – 48) in a pressure control system (col 2, line 50 – 67), and applying a correction in the amount of the calculated error to the boundary value component of the pressure control system (col 5, line 39 – 43). Stumpe/678 further updates a value representing the voltage necessary to take a valve of the pressure control system from a de-energized state to a just closed position (col 6, line 37 - 57; col 7, line 8 - 10).

However, Stumpe/678 does not show where the boundary value error and updating of voltage value are based on an error between commanded pressure and observed pressure. Stumpe/678 further does not show where the method observes an error between the commanded pressure and the observed pressure that is attributable to boundary value error, and then calculates a value of the error between the commanded pressure and the observed pressure.

Schubert/055 shows the commonly well-known method in the art where the boundary value error is based on an error between commanded pressure and observed pressure (col 4, line 12 – 16). Schubert/055 further shows the also commonly well-known method in the art of observing an error between the commanded pressure and the observed pressure (col 4, line 5 – 9) that is attributable to boundary value error (col 1, line 25 – 41), and then calculating a value of the error between the commanded pressure and the observed pressure (col 4, line 12 – 14).

It would have been obvious to one of ordinary skill in the art to modify the invention of Stumpe/678 by using the commonly well-known method in the art where the boundary value error and updating of voltage value are based on an error between commanded pressure and observed pressure. Further, modifying the invention by including the also commonly well-known method in the art of observing an error between the commanded pressure and the observed pressure that is attributable to boundary value error and then calculating a value of the error between the commanded pressure and the observed pressure as demonstrated by Schubert/055.

However, Stumpe/678 and Schubert/055 still do not show where the just-closed position has substantially zero seat force.

Schappler/688 teaches a commonly well-known brake pressure calibration method where the voltage necessary to take a valve of the pressure control system from a de-energized state to a just-closed position with substantially zero seat force is found (col 3, line 9-10). Where the inlet valve in shown passage is a solenoid valve that is analogous to applicant's valves, and the phrase "begins to open" obviously shows that the just closed value is the value before the actuation value Yv taught by Schappler/688.

It would have been obvious to one of ordinary skill in the art to provide Stumpe/678 with Schappler/688's teaching since it is commonly well-known and would have been a matter of design choice as to which parameter of the braking system to calibrate, as indicated by Stumpe/678 (col 6, line 37 - 57; col 7, line 8 -

10).

As to claim 16, Stumpe/678 and Schubert/055 disclose all elements per claimed invention as explained in paragraph regarding claim 1 above.

However, Stumpe/678 does not show that the boundary value component is calculated based on a single determination of the error between the commanded pressure and the observed pressure (055, 5, 28 – 49).

Schubert/055 shows a boundary value correction method that uses the commonly well-known method in the art of using a boundary value component that is calculated based on a single determination of the error between the commanded pressure and the observed pressure (col 5, line 28 – 49).

It would have been obvious to one of ordinary skill in the art to modify the invention of Stumpe/678 by using the commonly well-known method in the art of using a boundary value component that is calculated based on a single determination of the error between the commanded pressure and the observed pressure as demonstrated by Schubert/055.

As to claim 17, Stumpe/678 further shows the boundary value correction method implemented each time the pressure control system using the boundary value correction method is operated (col 7, line 52 – 55).

As to claim 18, Stumpe/678 further shows the error between the

commanded pressure and the observed pressure determined for an entire operating range of pressures (col 6, line 32 – 35) of the pressure control system.

As to claim 19, Stumpe/678 further shows the boundary value errors for the range of pressures determined by at least one of a pressure upward sweep (col 4, line 30 – 57) and a pressure downward sweep through the range of pressures (col 4, line 58).

As to claim 20, Stumpe/678 further shows the boundary value errors for the range of pressures determined by both of a pressure upward sweep (col 4, line 30 – 57) and a pressure downward sweep through the range of pressures (col 4, line 58).

As to claim 21, Stumpe/678 further shows the pressure downward sweep has different rates of pressure (col 4, line 30 – 31) decrease at different regions in the range of pressures (col 4, line 31 – 38).

6. Claim 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over Stumpe/678 in view of Schubert/055, further in view of Schappler/688, further in view of Campau et al. (5,941,608), henceforth referred to as “Campau/608”.

As to claim 14, Stumpe/678, Schappler/688 and Schubert/055 disclose all elements per claimed invention as explained in paragraph regarding claim 13 above.

However, Stumpe/678, Schappler/688 and Schubert/055 do not show that the estimation model is based on at least one of a linear function and an exponential function.

Campau/608 shows a commonly well-known method in the art of using a boundary value correction method where the estimation model is based on at least one of a linear function (col 6, line 35, (3)) and an exponential function (col 6, line 25, (2)).

It would have been obvious to one of ordinary skill in the art to modify the invention of Stumpe/678, Schappler/688 and Schubert/055 by adding the commonly well-known method in the art of using a boundary value correction method where the estimation model is based on at least one of a linear function and an exponential function as demonstrated by Campau/608.

### *Response to Arguments*

6. Applicant's arguments, see Applicant Arguments, filed 7/23/2008, with respect to the rejection(s) of claim(s) 1-21 under 35 U.S.C. 103(a) have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of Schappler/688, which teaches a commonly well-known calibration of the voltage necessary to take a valve of

the pressure control system from a de-energized state to a just-closed position as shown above.

***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to NICHOLAS KISWANTO whose telephone number is (571)270-3269. The examiner can normally be reached on Monday - Friday, 9AM - 6PM, EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Khoi Tran, can be reached on (571) 272-6919. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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